

felicity which Divine Providence in its wisdom may deign to shower down on Your Royal and Sacred Head—is the most ardent wish and fervent prayer of the President, Council, and Fellows of the Royal Society, in unison with all your other loyal subjects.”

The following papers were then read, viz.

“On the structure of the teeth, the vascularity of those organs, and their relation to bone.” By John Tomes, Esq. Communicated by Thomas Bell, Esq., F.R.S., Professor of Zoology in King’s College, London.

The microscopical examinations which the author has made of the structure of the teeth of man and various animals, lead him to the conclusion that their bony portions are formed of minute tubes, disposed in a radiated arrangement, in lines proceeding everywhere perpendicularly from the inner surface of the cavity containing the pulp. These tubuli are surrounded by a transparent material, which cements them together into a solid and dense mass. He finds, by applying the test of muriatic acid, that carbonate as well as phosphate of lime enters into their composition. In man, the tubuli, during their divergence from their origin at the surface of the central cavity, send off a number of very minute fibrils; and on approaching the enamel or the granular substance, which cover respectively the crown and the fangs of the tooth, the tubuli divide into smaller ones, which freely anastomose with one another, and then either are continued into the enamel, or terminate at the boundary between these two substances. Various modifications of this structure, exhibited in the teeth of different animals, in the class Mammalia and Fishes more particularly, are minutely described. The granular substance appears to be composed of irregularly shaped osseous granules, imbedded in the same kind of transparent medium which cements the tubuli together. External to the granular portion, the author finds another substance entering into the formation of the simple tooth, and commencing where the enamel terminates; and which he describes as beginning by a thin and transparent layer containing only a few dark fibres, which pass directly outwards; but assuming, as it proceeds towards the apex of the fang, greater thickness and opacity, and being traversed by vessels.

External to the enamel, and in close connexion with it, in compound teeth, is situated the *crusta petrosa*, a substance very similar to the bony layer of the simple tooth. It contains numerous corpuscles, and is traversed by numerous vessels entering it from without, and anastomosing freely with one another, but terminating in its substance. These investigations of the structure of the different component parts of teeth, furnish abundant evidence of their vascularity and consequent vitality.

“On the evolution of Nitrogen during the growth of plants, and the sources from whence they derive that element.” By Robert Rigg Esq. Communicated by the Rev. J. B. Reade, M.A., F.R.S., &c.

In this communication the author follows up his inquiry into the

influence and importance of nitrogen in vegetable physiology, by noticing, in the first place, the experiments of Dr. Daubeny, M. De Saussure, Sir Humphry Davy, and those which he himself has made; all of which tend to prove that nitrogen is evolved during the healthy performance of the functions of plants; that the proportion which it bears to the oxygen given off is influenced by the sun's rays; but that owing to the necessary exclusion of the external atmosphere during the progress of the experiments, it is impossible, with any degree of accuracy, to calculate the volume of these evolved gases during any period of the growth of plants in their natural state.

If to this indefinite quantity of nitrogen given off by plants there be added that definite volume incorporated into their substance and shown in the author's former tables, the question arises, whence do plants derive their nitrogen, and does any part of it proceed from the atmosphere? A problem which the author proposes to solve by a series of tabulated experiments upon seeds, and seedling plants, indicating a large excess of nitrogen in the latter, and under such circumstances of growth that he is compelled to fix upon the atmosphere as its source.

By the same mode of experimenting, the author attempts to show that the differences which we find in the germination of seeds and the growth of plants in the shade and sunshine, are apparently due in a great measure to the influence of nitrogen. And he concludes by observing, that he does not touch upon the practical application of the subject wherein the real value of the inquiry consists; it is his object to draw attention to an element which, though in some instances so minute in quantity as to be with difficulty detected in our balances, has nevertheless been wisely assigned to discharge the most important functions.

“On the decussation of fibres at the junction of the Medulla Spinalis with the Medulla Oblongata.” By John Hilton, Esq. Communicated by P. M. Roget, M.D., Sec. R.S.

The author first alludes to what usually happens in affections of the brain, namely, that the loss of voluntary power and of sensation manifest themselves in the opposite side of the body to that in which the cerebral lesion exists, a fact which has been attempted to be explained by the crossing of the fibres at the junction of the *medulla oblongata* with the anterior or motor columns of the *medulla spinalis*; but such a structure, he observes, affords no explanation of the loss of sensation. The author then, referring to the communication of Sir Charles Bell to the Royal Society, in the year 1835, describing a decussation connected with the posterior columns, or columns of sensation, mentions that the accuracy of these dissections was doubted by Mr. Mayo and other eminent anatomists. The author proceeds to state that the symptoms of cerebral lesion do not always take place on the opposite side of the body to that in which the lesion of the brain exists, but that they occur sometimes on the same side; that the loss of power and of sensation, although confined to the same side, may exist in either the upper or the lower extremity;